

great extent, upon its explanatory function. But this doctrine gave a secondary place to the consideration of practical utility to the "ordinary reader," and (to put the case on no higher ground) ignored the dependence of the work of reference upon the ordinary reader for any commercial success. After all, commercial success connotes wide utility. The encyclopædic method in a dictionary offers the reader something more than the bare solution of his ignorance of the meaning of any word; it may offer him connotation (in limited doses) as well as denotation; it may assist him, as "Webster" does, by appropriate pictorial illustration.

The encyclopædic method ought not, on one hand, to be used to the exclusion of the philological and other "purer" functions of the dictionary. Nor does the new "Webster" appear to transgress this provision. On the other hand, it is obvious that encyclopædic information must be strictly limited by considerations of space, and this makes exceedingly difficult the judgment of how far it should be included at all. Therefore the following instances (by no means isolated) taken to suggest that the present editors have carried the encyclopædic principle too far, are offered with due diffidence. Under the heading "Geography," after the general definition, there follow the main divisions of the science—mathematical, physical, &c., with their scope explained—very properly. Under "Geology" the same arrangement is given, and the various branches—cosmical, stratigraphical, and the like—are referred to. Then follows:—

"Geology is of comparatively recent development. Its basis as a true science may be said to have been laid by James Hutton (1726-97). It was advanced by the investigations of William Smith (1769-1839), and notably by the teachings of Sir Charles Lyell (1797-1875)."

And so the notice ends. It is submitted that this information, thought it might have formed the introduction for a brief treatise, is, by itself, practically valueless. Take, again, the homely instance (picked at hazard) of the notice on "Football," which defines the difference between the various codes of the game so far as to indicate the allowance or exclusion of the use of the hands, but gives no hint of difference in methods of scoring, or in the numbers of players constituting sides. This is surely a partial, and therefore wrong, application of the encyclopædic method.

Every allowance ought to be made to the editors of a general work of reference in their endeavours to save space. It is therefore possible to condone the method, theoretically indefensible, by which each page of the new dictionary is made up in two parts. In the upper and larger, all words of more common use (within a very wide range) are given in triple-column arrangement. In the lower, obsolete and local words, equivalents, alternatives, uncommon compounds, and the like, calling for only slight reference, are given in an arrangement of six columns of painfully small type. An excellent feature is the printing of an easy reference to the signs used to indicate pronunciation, at the foot of every page. In planning these

signs, such eccentricities as inverted letters have been happily avoided.

The illustrations do not reach the mechanical standard of other departments of the book. The coloured plates at the beginning, showing arms and flags of various nations, are indifferent, both in drawing and (at any rate in the impression before us) in colour-register, while many of the cuts illustrating the text are of somewhat archaic cast. A large selection of the latter are repeated at the end of the volume under a series of general headings, such as agriculture, anatomy, antiquities, and the like. The utility of this is not obvious; the classification reveals a certain degree of partiality, and the cuts, crowded together *en masse*, look frankly ugly.

The encyclopædic method has been held to justify, and with reason, the inclusion of a gazetteer and a biographical dictionary among the appendices. The names in these appear to have been methodically chosen. As this feature has been retained from the former issue, we do not entirely follow the editorial judgment in including scriptural, classic, and other proper names, characters of fiction, and the like, in the body of the dictionary. Such arrangement may tend to confusion on the part of the user of the book. On the other hand, he will be the more ready to excuse any difficulty in this direction in consideration of the ease with which any desired letter or section of the work may be found, for the makers have retained the familiar and excellent system of indicating sections by marked indentations in the margin of the pages, so that the closed volume may be opened at any desired place. Finally, it may be said that though the additions to the matter of the work as a whole are so numerous as to have more than doubled the number of entries in the previous edition, and to have added several hundred pages, the bulk of the volume is not seriously increased. Such criticisms as have been offered above are recognised to be mostly upon debatable ground, and it is freely admitted that the new edition does nothing to mar, and much to add to, the established reputation of "Webster."

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GLAUCOMA AND ITS CAUSE.

Glaucoma. By Dr. Thomas Henderson. Pp. xv+222. (London: Edward Arnold, 1910.) Price 10s. 6d. net.

GLAUCOMA is that condition of the eyeball in which the intraocular tension, normally greater than the superincumbent atmospheric pressure by about 20-25 mm. Hg., is pathologically still further increased so as to produce various deleterious results. It has hitherto been generally held that variations in the intraocular pressure are produced by changes in the amount of the fluid contents of the globe; that alterations in the quantity of blood may be considered negligible in this respect; and that such variations as occur affect the lymph of the eye. The lymph is thought to be secreted by the ciliary processes, and to be excreted through the so-called "filtration" angle of the anterior chamber into the venous plexus which goes by the name of the canal of Schlemm. On

this theory the intraocular tension will vary with the relationship of secretion to excretion of lymph. It is clearly a postulate of the theory that some alteration in the volume of the globe occurs under differing internal pressures, though the necessary amount may be so slight as almost to escape the ordinary crude methods of experimental analysis.

Dr. Henderson propounds a theory which is merely the application of the Monro-Kellie doctrine of intracranial pressure to the eye. This theory of intracranial pressure has been proved substantially true by the researches of Mr. Leonard Hill, and Dr. Henderson, postulating the constancy of volume of the eyeball under all pressures, physiological and pathological, embarks upon a bold attempt to make all the arguments fit in the case of the eye. He holds that in the normal eye the total volume is constant, the circulatory system is elastic, and that diffusion takes place between the contained fluids and the return (venous) circulation. Hence the intraocular pressure is equal to the venous pressure of the elastic system. In glaucoma the total volume is fixed, and there is an absence of diffusion between the contained fluids and the return circulation. Hence the fluid and incompressible contents act as a rigid volume, converting the elastic circulatory system into a rigid one. The outflow pressure of a rigid system is always higher than that of a similar elastic system of tubes. Therefore the intraocular pressure is raised, as the lowest circulatory pressure is that of a rigid, not an elastic system. The starting point of the process in glaucoma is held to be sclerosis of the cribiform or pectinate ligament, whereby the diffusion of the aqueous into Schlemm's canal is hindered. The explanation of the success of iridectomy as a cure for the disease is founded upon the fact that wounds of the healthy iris stroma do not cicatrize in the ordinary manner of connective tissues. The aqueous is thus brought into more intimate contact with the iris veins, and is enabled to drain away.

It will be realised from this brief account that the theory is revolutionary in its relation to certain hitherto accepted facts. In some such instances the author has audaciously thrown over the facts. The most striking example of this procedure concerns the anatomy of the ciliary circulation. No one has previously questioned Leber's brilliant researches on the circulation of the eye. Dr. Henderson, from an exhaustive examination of serial sections, asserts that the circulus arteriosus iridis major is not an artery but a vein. Adopting the teleological argument that there is no rhyme or reason for such an abundant arterial supply to so insignificant a structure as the iris, it is an easy step to transform arteries into veins for the benefit of the theory. We do not consider that the examination of serial sections can possibly prove the point conclusively, unless the blood-vessels have been previously injected, as was done in Leber's researches. It may be hoped that Dr. Henderson or others will adopt this more conclusive test.

Dr. Henderson's fundamental postulate, that of the constancy of volume of the eyeball under physiological and pathological pressures, cannot be accepted without reserve. The walls of the eye, though rigid, cannot

be regarded as rigid in the same sense as the walls of the cranium. There is experimental evidence to the contrary, notably that afforded by the researches of Koster Gzn. Further, there is positive evidence of vasomotor changes in the intraocular blood-vessels, a fact which militates against the theory.

Moreover, if the intraocular pressure is purely a question of transmitted hydrostatic pressure in the sense of the term as used by Dr. Henderson, why does the pressure fall slowly and gradually when the eyeball is excised? This and other questions will have to be answered satisfactorily before the theory can be adopted. There is no doubt, however, that the author has elaborated an important element of the problem. His work should be read by all physiologists and ophthalmologists, and cannot but prove to be stimulating to thought, and, it may be hoped, to further experimental research.

EXPERIMENTAL THERAPEUTICS.

Einführung in die experimentelle Therapie. By Prof. M. Jacoby. Pp. vii+180. (Berlin: J. Springer, 1910.) Price 5 marks.

UNTIL the middle of last century therapeutics was a purely clinical study, the physician treating his patients on purely empirical grounds and without any clearly conceived idea of how his measures affected the course of the disease. About fifty years ago the experimental study of the action of drugs was taken up by a number of investigators, and the school of experimental pharmacology succeeded to the ancient study of *materia medica*. The benefits accruing to medicine from this school are recognised by all who have followed the course of therapeutics in the last half-century; but its members in some degree have stood aloof from the great movement which, beginning with the discovery of pathogenic organisms, has progressed to the discovery of their antidotes in the antitoxins, and to the treatment of disease by these last. The workers on therapeutics who have approached the subject from the bacteriological laboratory have accordingly assumed a new and distinct title for it—experimental therapeutics—and show a tendency to broaden its borders to include such work as that which has culminated in Ehrlich's discovery of the new anti-syphilitic specific. Yet the methods followed by Ehrlich are exactly similar in essentials to those of Schmiedeberg or von Mering in their researches on hypnotics; and the fact that the former was seeking a remedy to act on the treponema in the tissues, and the others for a remedy for the over-excited nerve cell, does not seem to justify their subjects being classed under different headings.

The book before us seeks to give a bird's-eye view of the position of the subjects in therapeutics which have recently been investigated experimentally. Beginning with some examples of pharmacological antagonism, the author leads us through the development of the therapeutics of the internal secretions (*Substitutionstherapie*) to the experimental investigations on antiparásiticides; under this he groups the treatment with vaccines, antitoxins, and Ehrlich's